

Annual Report

Team Onyx India (2018-2019)

K. J. Somaiya College of Engineering, Mumbai-77

(Autonomous College Affiliated to University of Mumbai)

Name of the organization/chapter/project: Team Onyx India**List of Members/Details of Committee- 2017-2018**

Sr. No.	Name of the Faculty advisor/ in-charge	Department	Portfolio
1	Professor Prashant Jain	Mechanical	Adviser

Sr No.	Name	Branch	Portfolio
1	Parth Gabani	Mechanical	Captain and Aerodynamics Head
2	Vishal Thakkar	Mechanical	Marketing Head
3	Adhiraj Pimpalkar	Mechanical	Manufacturing Head
4	Burhannudin Bhavnagarwala	Mechanical	Structural Head
5	Mayur Nandu	EXTC	Propulsion Head
6	Akshay Bhanushali	EXTC	Propulsion
7	Raj Mandal	Mechanical	Joint Marketing Head
8	Arpit Shah	Mechanical	Joint Aerodynamics Head
9	Nadeem Noor Mohammed	Mechanical	Inventory Manager
10	Saurabh Shetake	Mechanical	Structural
11	Nirav Dangi	Mechanical	Structural
12	Mohit Kawa	Mechanical	Manufacturing
13	Rishi Savla	Mechanical	Manufacturing
14	Aryan Gandhi	Mechanical	Manufacturing
15	Arnab Lahiri	Mechanical	PR
16	Arya Bafna	ETRX	Propulsion
17	Harmanjeet Singh Bilkhu	ETRX	Propulsion
18	Poonam Chawda	ETRX	Propulsion
19	Vidya Makwana	Computer	Web Development

Photo of members/committee – 2018-2019



Details of events/activities held during academic year 2018-2019

Sr. No. of Event / Activity	Day/Date	Year	Month	Time	Venue	Description of Activity
1.	8 th - 9 th September	2018	September	--	KJSCE	Aero-Modelling Workshop : A two -day Aero-modelling workshop was conducted to teach students about ‘Basics of Design and fabrication of RC Aircrafts’
2.	28 th December	2018	December	--	IIT,Bombay	Boeing National Aeromodelling Competition: Participation in Boeing National Aeromodelling Competition.It was held at IIT Bombay
3.	8 th -10 th March	2019	March	--	Texas	SAE Aero-Design East : Participation at SAE Aero-Design East held at Fort Worth, Dallas, Texas

Reports of event/activity

Sr. No. of Event / Activity	Day/Date	Year	Month	Time	Venue	Description of Activity
1	8 th -9 th September	2018	September	--	KJSCE	Aero-Modelling Workshop : A two-day Aero-modelling workshop was conducted to teach students about 'Basics of Design and fabrication of RC Aircrafts'

Details of participation in the event/activity
(Fill wherever is applicable or information is available. At least total need to fill)

No of students / faculty	COMP	ETRX	EXTC	IT	MECH	Total no of participants
FY						93
SY						
TY						
LY						
No of Faculty						

Report of event/activity

Aero-Modelling Workshop

Team Onyx India conducted a two-day Aero-Modelling Workshop to teach students about the basics of Aero-Modelling. The first day was a lecture session where the students were taught about Aerodynamics and how various factors play into designing and manufacturing of a real aircraft. The students were also taught the use of various software like XFLR5 and Solidworks by conducting a practical and interactive sessions. The second day of the workshop was used to teach the students how to build their own RC Aircraft and simultaneously conducted test flights of all the aircraft of the students. The students were presented with the aircraft they built as a takeaway.

Sample Photographs of the Event/Activity



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Sr. No. of Event / Activity	Day/Date	Year	Month	Time	Venue	Description of Activity
2		2018	December	--	IIT,Kanpur	Boeing National Aeromodelling Competition: Participation in Boeing National Aeromodelling Competition.It was held at IIT Bombay

Details of participation in the event/activity
(Fill wherever is applicable or information is available. At least total need to fill)

No of students / faculty	COMP	ETRX	EXTC	IT	MECH	Total no of participants
FY						7
SY						
TY						
LY						
No of Faculty						

Report of event/activity

Competition: Boeing National Aeromodelling Challenge

Overview

Team Onyx India participated in Boeing National Aero-modelling Competition that is held at IIT Bombay 28th-30th December 2018. It was a competition for undergraduate Aero-Modelling Enthusiasts to test their fabrication and designing skills at a basic level. The aircraft built in this competition have gliding as their primary function and had certain design parameter constraints.

Preparations

We started preparing for the competition in the month of September. As we had an influx of new members, we wanted to teach them the very basics of fabrication, designing and also wanted them to experience the environment in a competition to help them in the long run. We started to design and choose our parameters using XFLR5 while simultaneously using ideas and innovations from the new recruits. We then moved on to the stage of fabrication after the month of September ended. The fabrication went relatively quickly as material selection was done to make the process quick while making it cost efficient. The fabrication process ended and the flying practices was started a month prior to the competition to ensure that pilots get constant practices and be competition ready. These practices honed the skills of the pilot to the point where they can fly the basic aircraft at relative ease.

Competition

The competition started with procession by the organisers about the sport of Aero-Modelling and encouraging thorough participation in the future as well. This was followed by the test of thrust-to-weight ratio, in which every aircraft goes through with inspection of the thrust to weight ratio of the overall aircraft. This was followed by flights of the aircraft and each aircraft was given one turn of flight, two turns were provided if necessary due to undesirable errors. The scoring was based on the the glide time of each aircraft. The top 30 teams with the best glide time were selected were for the second round of the competition. The second round of the competition encompasses a dropping

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flight round where participants have to manoeuvre an aircraft around a course and drop the payload at a specified target. We were successful in the flight rounds but due to lack of experience of the newly trained pilots we were unable to secure a good rank.

Conclusion

The Competition was a very good experience for the new recruits and will definitely prove useful in future ordeals as they will have experienced the environment of a real competition. The pilots also did a professional job as they learned flying and maneuvering at a relatively fast rate, paving the way for great future potential.

Details of prizes (wherever applicable fill all the entries)

Sr. No.	Name of the student	Department	Details of prize won	Remarks
1	Team Onyx India 2018-2019	MECH	--	

Sample Photographs of the Event/Activity



K. J. Somaiya College of Engineering, Mumbai-77
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Sr. No. of Event / Activity	Day/Date	Year	Month	Time	Venue	Description of Activity
3	8 th - 10 th March	2019	March	--	Fort Worth, Dallas	SAE Aero Design East : Participation at SAE Aero-Design East held at Fort Worth, Dallas, Texas

Details of participation in the event/activity

(Fill wherever is applicable or information is available. At least total need to fill)

No of students / faculty	COMP	ETRX	EXTC	IT	MECH	Total no of participants
FY						5
SY						
TY						
LY						
No of Faculty						

Report of event/activity

Competition: SAE Aero-Design East

Overview

Team Onyx India participated in the recently concluded SAE Aero Design East 2019. This exercise allows students to apply knowledge gained in the classroom in a real work environment. To help develop the students' written and oral communication skills, a sizable percentage of each team's score is devoted to the design report and oral presentation required in the competition. A total of eighteen students contributed to the preparations for the competition, while five students went for the competition. We also took our Team Pilot and Alumni Mr. Sohrab Mistri (Faculty at IIT Bombay) at the competition along with two other participating teams from Mumbai i.e., DJSCE & MPSTME,

Preparations

We had started preparing for the competition in the month of September working upon the design flaws and scope for further improvements. We had faced an issue with the landing gears mechanisms, structural aspects of wing and effective mechanisms for the control surfaces of the aircraft. Hence these systems needed to be made more reliable. We took a major decision of updating the design of the fuselage to accommodate new payload volume of tennis balls and payload plates for the international competition. We also focused on reducing the empty weight of the aircraft to increase the payload weight to achieve maximum during the flight rounds. This was done exploring new materials that had high strength to weight ratios.

We also did a major focus on the aerodynamic sizing of control surfaces for the pilot to sustain and handle the aircraft in extreme windy conditions. This was ensured by designing large control surface areas for ailerons and rudder to withstand heavy crosswinds at the competition site and also taking maximum test flights here with the pilot.

Two prototype aircrafts were fabricated to test certain aerodynamic and structural changes and the first test flight of the prototype was performed in the first week of December. During the test

flights, the nose steering landing gear tend to bend at extreme dynamic conditions and hence the design was changed. The second prototype was built with further scope of reduction in empty weight and was tested in the last week of December. The aircraft was tested at with incremental increase in payload weight and crashed at maximum takeoff weight of 21 kg, i.e. at the maximum design point. Hence, the team finalized to lift 20 kg for avoiding any risks at the competition.

Hence, the design was finalized and two aircrafts were built for the competition with all necessary documents and packing. We departed for the competition on 5th of March with the aircraft boxes and necessary tools & equipment with us.

Competition

Day 1: Technical Inspection and Technical Presentation

Day 1 of the competition began with the line up for the Technical Inspection. The team reached on time and we were among the first teams to be ready for the inspection. We faced a rule issue attempt but managed to clear the inspection in the first attempt and later moved forward for the Technical Presentation Round. We finished the presentation well within the allotted time and the judges responded with a positive feedbacks. We were also commended as the best 'Project Management Plan' by the judges and officials. We stood 13th Overall in the Technical Presentation round.

Day 2: Flight Rounds

The following day was hit by a thunderstorm followed by heavy rains, this caused severe delay in the flight rounds. They were supposed to start at 8am but because of heavy cross winds the they started at 9am .All the flight tests of the teams had resulted in crashes in round 1 because of the gusty cross winds .Many teams decided to pass round 1. We decided to attempt the flight round with the lesser weight but unfortunately the aircraft could not handle the gusty winds and ended up as a failed flight. We were prepared for a failed flight as we had carried a spare aircraft which gave us a liberty of taking high risk. Very few teams had fabricated a spare aircraft and they ended up not taking flights hence receiving a heavy penalty.

Day 3: Flight Rounds and Award Presentation

At Day 3 flight rounds continued and this time with good weather conditions. We were able to perform a flights with moderate weight, hence having successful flight rounds. As the day went on, other universities from around world took test flights and we started to talk to with students from other universities to gain further insight and gain knowledge in many sectors which will enable us to perform even better the next time around. In the evening, the award ceremony underwent and awards pertaining to different categories in different classes were presented to the winning teams. The competition was hence concluded as the ceremony ended with the organization of SAE thanking everyone for participating.

Conclusion

The competition was a very good learning experience. It allowed the team members to interact with industrial experts and members of the other teams. We got great positive design feed-backs from the judges and the team is now confident and prepared to present at the next competition – SAE Aero Design West 2020, Lakeland, Florida US where we will be targeting to compete with the best universities in the world.

Details of prizes (wherever applicable fill all the entries)

Sr. No.	Name of the student	Department	Details of prize won	Remarks
1	Team Onyx India 2018-2019	MECH		

Sample Photographs of the Event/Activity

